What is claimed is:

1. A method for aligning microbeads to be read by a code reading or other detection device, comprising the step of:

providing microbeads to a positioning device, each having an elongated body with a code embedded therein along a longitudinal axis thereof;

aligning the microbeads with the positioning device so the longitudinal axis of the microbeads is in a fixed orientation relative to the code reading or other detection device.

2. A method according to claim 1, wherein the positioning device is a plate having a multiplicity of grooves therein.

3. A method according to claim 1, wherein the method includes agitating the plate to encourage the alignment of the microbeads in the grooves.

4. A method according to claim 1, wherein the microbeads are cylindrically shaped glass beads between 25 and 250 microns in diameter and between 100 and 500 microns long.

5. A method according to claim 1, wherein the microbeads have a holographic code embedded in a central region thereof.

6. A method according to claim 1, wherein the code is used to correlate a chemical content on each bead with a measured fluorescence signal.

7. A method according to claim 1, wherein each microbead is substantially aligned in relation to its pitch and yaw rotational axes.

8. A method according to claim 1, wherein the plate has a series of parallel grooves having one of several different shapes, including square, v-shaped or semi-circular.

9. A method according to claim 1, wherein the plate is an optically transparent medium including boro-silicate glass, fused silica or plastic, and the grooves are formed therein.

10. A method according to claim 1, wherein the grooves have a depth that is dimensioned to be at least the diameter of the microbeads, including at least 110% of the diameter of the microbead.

11. A method according to claim 1, wherein either the grooves have a depth between 10 and 125 microns, the depth is dimensioned within 90% of the diameter of the microbeads, or a combination thereof.

12. A method according to claim 1, wherein the spacing of the grooves is between 1 and 2 times the diameter of the microbeads.

13. A method according to claim 1, wherein the grooves have a width that is dimensioned to prevent the beads from rotating therein by more than a few degrees.

14. A method according to claim 1, wherein the grooves have a width that is dimensioned within 5% of the diameter of the microbeads.

15. A method according to claim 1, wherein the grooves have a bottom that is flat

enough to prevent the beads from rotating, by more than a few tenths of a degree, relative to the code reader device.

16. A method according to claim 1, wherein the code reader device includes a readout camera.

17. A method according to claim 1, wherein the step of agitating the plate includes using a sonic transducer, a mechanical wipe, or shaking or rocking device.

18. A method according to claim 1, wherein the method includes using an open format approach by dispensing the microbeads onto the plate using a pipette tip or syringe tip and not covering the plate.

19. A method according to claim 1, wherein the method includes a closed format approach by dispensing the microbeads into a cuvette-like device having comprising the plate, at least three walls and a cover.

20. A method according to claim 19, wherein the step of dispensing includes injecting the microbeads into the cuvette-like device by placing them near an edge of an opening and allowing the surface tension, or an induced fluid flow, to pull the microbeads into the cuvette-like.

21. A method according to claim 19, wherein the method includes using a closed format approach by sectioning a closed region into two regions, a first region where the microbeads are free to move about in a plane, either in a groove or not, and a second region where the microbeads are trapped in a groove and can only move along the axes of the grooves.

22. A method according to claim 21, wherein the method includes the step of trapping the microbeads in a groove by reducing the height of the closed region so that the microbeads can no longer come out of the groove.

23. A method according to claim 21, wherein the first region is used to pre-align the beads into a groove, facilitating the introduction of beads into the second region.

24. A method according to claim 21, wherein the method includes tilting the cuvette-like up so gravity can be used to pull the microbeads along a groove from the first region to the second region.

25. A method according to claim 21, wherein the plate is made of silicon having walls formed by Su8 coupled thereto, or having walls formed by etching the silicon.

26. A method according to claim 1, wherein the method includes the step of identifying a chemical content on the surface of the microbead with a measured fluorescence signal.

27. A method according to claim 1, wherein the method includes passing a code reading signal through the microbead aligned on the positioning device.

28. A method according to claim 1, wherein the method further includes the step of correlating a chemical content identified on each microbead with a fluorescence signal, including one provided by an incident laser beam device.

29. A method according to claim 1, wherein the method includes the step of identifying the code in the microbead.

30. A method according to claim 1, wherein the grooves of the plate are formed using a photo lithographic process.

31. A method according to claim 1, wherein the plate includes a glass plate having Su8 thereon.

32. A method according to claim 1, wherein the glass plate is a low fluorescence glass.

33. A method according to claim 1, wherein the glass plate is a boro silicate glass.

34. A method according to claim 1, wherein the grooves on the plate are mechanically machined.

35. A method according to claim 1, wherein the grooves on the plate are formed by deep reactive ion etching.

36. A method according to claim 1, wherein the grooves on the plate are formed by injection molding.

37. A method according to claim 2, wherein the plate has a mirror coating.

38. A method according to claim 2, wherein the plate is a disk having circumferential grooves, concentric grooves, or a combination thereof.

39. A method according to claim 2, wherein the plate is a disk having radial grooves.

40. A method according to claim 2, wherein the plate is a disk having a microbead loading area located in the center of the disk.

41. A method according to claim 2, wherein the plate is a disk having one or more radial water channels extending from the center to the outer periphery thereof.

42. A method according to claim 2, wherein the method includes arranging the plate on a rotating disk.

43. A method according to claim 1, wherein the positioning device is a flow tube.

44. A method according to claim 43, wherein the step of providing includes providing the microbeads to the flow tube in a fluid.

45. A method according to claim 1, wherein the microbeads have tubular holes extending therethrough.

46. A method according to claim 1, wherein the microbeads have teeth or protrusions thereon.

47. Apparatus for aligning microbeads to be read by a code reading device,

comprising:

a positioning device for aligning microbeads, each microbead having an elongated body with a code embedded therein along a longitudinal axis thereof, so the longitudinal axis of the microbeads is positioned in a fixed orientation relative to the code reading device.

48. Apparatus according to claim 47, wherein the positioning device is a plate having a multiplicity of grooves therein.

49. Apparatus according to claim 47, wherein the apparatus includes means for agitating the plate to encourage the alignment of the microbeads in the grooves.

50. Apparatus according to claim 47, wherein the microbeads are cylindrically shaped glass beads between 25 and 250 microns in diameter and between 100 and 500 microns long.

51. Apparatus according to claim 47, wherein the microbeads have a holographic code embedded in a central region thereof.

52. Apparatus according to claim 47, wherein the positioning device is a rotating disk having a multiplicity of circumferential grooves, concentric grooves or a combination thereof formed therein, or having one or more spiral grooves.

53. Apparatus according to claim 47, wherein the positioning device is a tube.

54. Apparatus for aligning an optical identification element, comprising:

the optical identification element having an optical substrate having at least a portion thereof with at least one diffraction grating disposed therein, the grating having at least one refractive index pitch superimposed at a common location, the grating providing an output optical signal when illuminated by an incident light signal, the optical output signal being indicative of a code, and the optical identification element being an elongated object with a longitudinal axis; and

an alignment device which aligns the optical identification element such that said output optical signal is indicative of the code.

55. Apparatus according to claim 54, wherein the alignment device is a plate having a multiplicity of grooves therein.

56. Apparatus according to claim 55, wherein the plate is a disk and the multiplicity of grooves are concentric circles or a spiral.

57. Apparatus according to claim 54, wherein the alignment device is a tube having a bore for receiving the optical identification element.